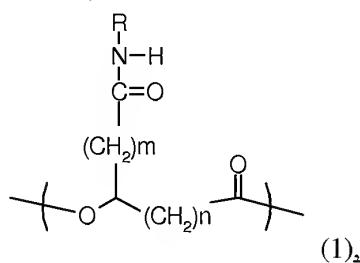


B. Claims

The following is a complete listing of the claims, and replaces all earlier versions and listings.

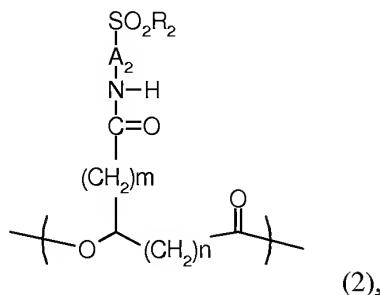
1. (Currently Amended) Polyhydroxalkanoate comprised of A polyhydroxalkanoate comprising at least a unit represented by a chemical formula (1) within the its molecule:



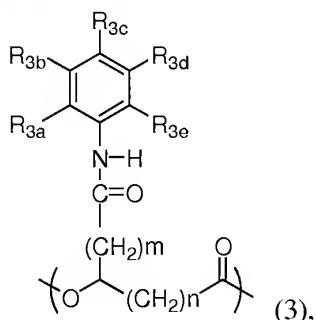
wherein R represents $-A_1-SO_2R_1$; R_1 represents OH, a halogen atom, ONa, OK or OR_{1a} ; R_{1a} and A_1 each independently represents a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure or a substituted or unsubstituted heterocyclic structure; n represents an integer selected from 0 to 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, and m represents 0 in case n is 1; and in case plural units are if more than one unit of the chemical formula (1) is present, each of R, R_1 , R_{1a} , A_1 , m, and n have the aforementioned meanings is independently selected for each unit.

2. (Withdrawn-Currently Amended) Polyhydroxalkanoate The polyhydroxalkanoate according to claim 1, comprised of, as the unit represented by the

chemical formula (1), at least a unit represented by a chemical formula (2), a chemical formula (3), a chemical formula (4A) or (4B), within the molecule:



wherein R_2 represents OH , a halogen atom, ONa , OK or OR_{2a} ; R_{2a} represents a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group, A_2 represents a linear or branched alkylene group with 1 to 8 carbon atoms; n represents an integer selected from 0 to 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, and m represents 0 in case n is 1; and ~~in case plural units are if more than one unit of the chemical formula (2) is present, each of~~ A_2 , R_2 , R_{2a} , m , and n ~~have the aforementioned meaning~~ is independently selected for each unit;



wherein each of R_{3a} , R_{3b} , R_{3c} , R_{3d} and R_{3e} each independently represents SO_2R_{3f} (R_{3f} representing OH , a halogen atom, ONa , OK or OR_{3f1} (R_{3f1} representing a linear

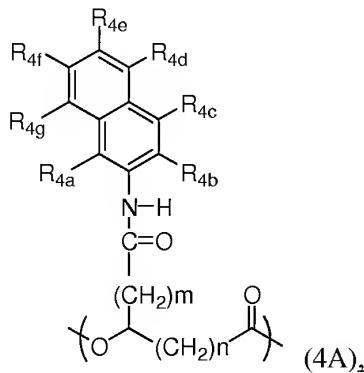
or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group), a hydrogen atom, a halogen atom, an alkyl group with 1 - 20 carbon atoms, an alkoxy group with 1 - 20 carbon atoms, an OH group, an NH₂ group, an NO₂ group, COOR_{3g} (R_{3g} representing a H atom, a Na atom or a K atom), an acetamide group, an OPh group, a NHPh group, a CF₃ group, a C₂F₅ group, or a C₃F₇ group (Ph indicating a phenyl group), of which at least one is SO₂R_{3f}; n represents an integer selected from 0 to 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, and m represents 0 in case n is 1; and in case plural units are if more than one unit of the chemical formula (3) is present, each of R_{3a}, R_{3b}, R_{3c}, R_{3d}, R_{3e}, R_{3f}, R_{3f1}, R_{3g}, m₂ and n have the aforementioned meanings is independently selected for each unit,

where R_{3f} is OH, a halogen atom, ONa, OK, or OR_{3f1};

R_{3f1} is a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group;

R_{3g} is H, Na, or K; and

Ph is a phenyl group;



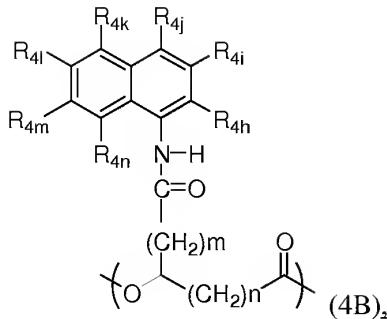
wherein each of R_{4a} , R_{4b} , R_{4c} , R_{4d} , R_{4e} , R_{4f} and R_{4g} each independently represents SO_2R_{4o} (R_{4o} representing OH, a halogen atom, ONa , OK or OR_{4o1} (R_{4o1} representing a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group)), a hydrogen atom, a halogen atom, an alkyl group with 1 - 20 carbon atoms, an alkoxy group with 1 - 20 carbon atoms, an OH group, an NH_2 group, an NO_2 group, $COOR_{4p}$ (R_{4p} representing a H atom, a Na atom or a K atom), an acetamide group, an OPh group, an $NHPh$ group, a CF_3 group, a C_2F_5 group, or a C_3F_7 group (Ph indicating a phenyl group), of which at least one is SO_2R_{4o} ; n represents an integer selected from 0 to 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, and m represents 0 in case n is 1; and in case plural units are if more than one unit of the chemical formula (4A) is present, each of R_{4a} , R_{4b} , R_{4c} , R_{4d} , R_{4e} , R_{4f} , R_{4g} , R_{4o} , R_{4o1} , R_{4p} , m , and n have the aforementioned meanings is independently selected for each unit,

where R_{4o} is OH, a halogen atom, ONa , OK , or OR_{4o1}

R_{4o1} is a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group;

R_{4p} is H, Na, or K; and

Ph is a phenyl group;



wherein each of R_{4h}, R_{4i}, R_{4j}, R_{4k}, R_{4l}, R_{4m} and R_{4n} each-independently represents SO₂R_{4o} (R_{4o} representing OH, a halogen atom, ONa, OK or OR_{4o1} (R_{4o1} representing a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group)), a hydrogen atom, a halogen atom, an alkyl group with 1 - 20 carbon atoms, an alkoxy group with 1 - 20 carbon atoms, an OH group, an NH₂ group, an NO₂ group, COOR_{4p} (R_{4p} representing a H atom, a Na atom or a K atom), an acetamide group, an OPh group, an NHPh group, a CF₃ group, a C₂F₅ group or a C₃F₇ group (Ph indicating a phenyl group), of which at least one is SO₂R_{4o}; n represents an integer selected from 0 to 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, and m represents 0 in case n is 1; and in case plural units are if more than unit of the chemical formula (4B) is present, each of R_{4h}, R_{4i}, R_{4j}, R_{4k}, R_{4l}, R_{4m}, R_{4n}, R_{4o}, R_{4o1}, R_{4p}, m₂ and n have the aforementioned meanings is independently selected for each unit,

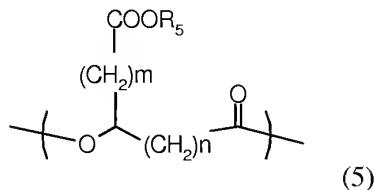
where R_{4o} is OH, a halogen atom, ONa, OK, or OR_{4o1};

R_{4o1} is a linear or branched alkyl group with 1 to 8 carbon atoms or a substituted or unsubstituted phenyl group;

R_{4p} is H, Na, or K; and

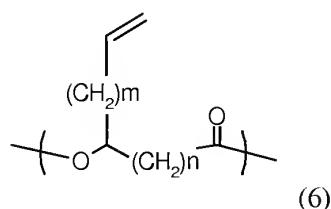
Ph is a phenyl group.

3. (Withdrawn) Polyhydroxyalkanoate comprised of at least a unit represented by a chemical formula (5) within the molecule:



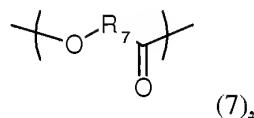
wherein R₅ represents hydrogen, a group capable of forming a salt or R_{5a}; R_{5a} represents a linear or branched alkyl group with 1 - 12 carbon atoms, an aralkyl group or a substituent having a sugar; n represents an integer selected from 0, 2, 3, 4; m represents an integer selected from 2 - 8 in case n is 0, wherein R₅ represents R_{5a} only in case m is 2, and m represents an integer selected from 0 - 8 in case n is an integer selected from 2 - 4; and in case plural units are present, R₅, R_{5a}, m and n have the aforementioned meanings independently for each unit.

4. (Withdrawn) Polyhydroxyalkanoate comprised of at least a unit represented by a chemical formula (6) within the molecule:



wherein n represents an integer selected from 0, 2, 3, 4; m represents an integer selected from 2 - 8 in case n is 0, m represents an integer selected from 0 - 8 in case n is 2 or 3, and m represents an integer selected from 0 and 2 - 8 in case n is 4; and in case plural units are present, m and n have the aforementioned meanings independently for each unit.

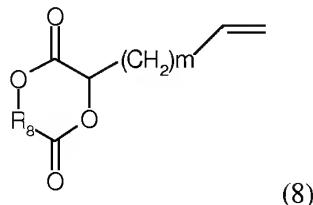
5. (Currently Amended) ~~Polyhydroxyalkanoate~~ The polyhydroxyalkanoate according to any one of claims 1 to 4, further comprising a unit represented by a chemical formula (7) within the molecule:



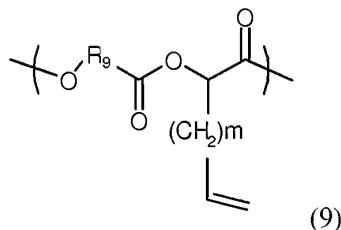
wherein R₇ represents a linear or branched alkylene with 1 - 11 carbon atoms, an alkyleneoxyalkylene group (each, where each alkylene group being independently with has 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms, or an alkylidene group with 1 - 5 carbon atoms, which is unsubstituted or substituted with an aryl group; and in case plural units are if more than one unit of the chemical formula (7) is present, R7 has the aforementioned meaning is independently selected for each unit.

6. (Withdrawn) A method for producing polyhydroxyalkanoate

represented by a chemical formula (9), comprised of a step of polymerizing a compound represented by a chemical formula (8) in the presence of a catalyst:

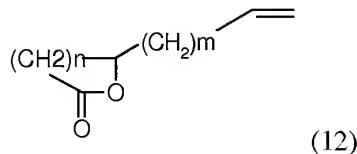


wherein R₈ represents a linear or branched alkylene with 1 - 11 carbon atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which is unsubstituted or substituted with an aryl group; and m represents an integer selected from 2 - 8;

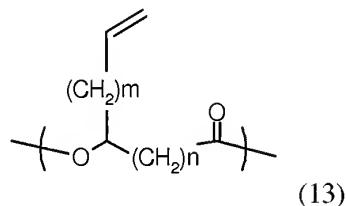


wherein R₉ represents a linear or branched alkylene or alkyleneoxyalkylene group with 1 - 11 carbon atoms (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which is unsubstituted or substituted with an aryl group; m represents an integer selected from 2 - 8; and in case plural units are present, R₉ and m have the aforementioned meanings independently for each unit.

7. (Withdrawn) A method for producing polyhydroxyalkanoate represented by a chemical formula (13), comprised of a step of polymerizing a compound represented by a chemical formula (12) in the presence of a catalyst:



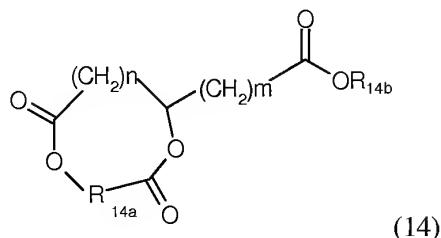
wherein n represents an integer selected from 2 to 4; m represents an integer selected from 0 - 8 in case n is 2 or 3, and m represents an integer selected from 0 and 2 - 8 in case n is 4:



wherein n represents an integer selected from 2 to 4; m represents an integer selected from 0 - 8 in case n is 2 or 3, and m represents an integer selected from 0 and 2 - 8 in case n is 4, and in case plural units are present, m and n have the aforementioned meanings independently for each unit.

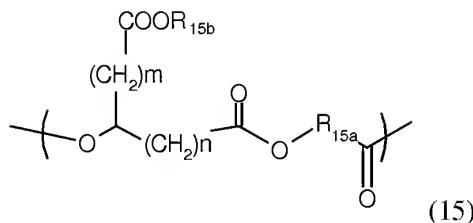
8. (Withdrawn) A method for producing polyhydroxyalkanoate represented by a chemical formula (15), comprised of a step of polymerizing a compound

represented by a chemical formula (14) in the presence of a catalyst:



(14)

wherein R_{14a} represents a linear or branched alkylene with 1 - 11 carbon atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which is unsubstituted or substituted with an aryl group; R_{14b} represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group; n represents an integer selected from 0, 2, 3 and 4; m represents an integer selected from 2 - 8 in case n is 0 and an integer selected from 0 - 8 in case n is selected from 2 - 4;

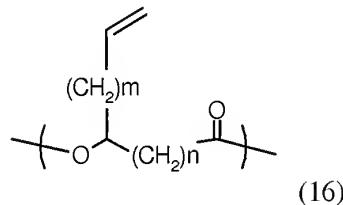


(15)

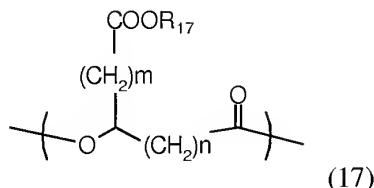
wherein R_{15a} represents a linear or branched alkylene with 1 - 11 carbon atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which is unsubstituted or substituted with an aryl group

group; R_{15b} represents a linear or branched alkyl with 1 - 12 carbon atoms or an aralkyl group; n represents an integer selected from 0, 2, 3 and 4; m represents an integer selected from 2 - 8 in case n is 0 and an integer selected from 0 - 8 in case n is selected from 2 - 4; and in case plural units are present, R_{15a} , R_{15b} , m and n have the aforementioned meanings independently for each unit.

9. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (17), comprised of a step of oxidizing a double bond portion of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (16):



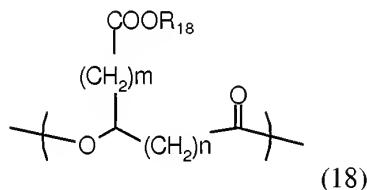
wherein m represents an integer selected from 0 - 8; n represents 0, 2, 3 or 4; and, in case plural units are present, m and n have the aforementioned meanings independently for each unit:



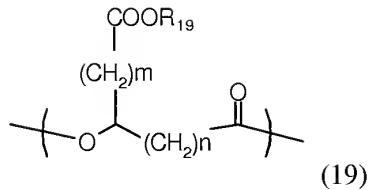
wherein m represents an integer selected from 0 - 8; R_{17} represents

hydrogen, or a group capable of forming a salt; n represents 0, 2, 3 or 4; and, in case plural units are present, m, n and R₁₇ have the aforementioned meanings independently for each unit.

10. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (19), comprised of a step of executing hydrolysis of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (18) in the presence of an acid or an alkali, or a step of executing hydrogenolysis comprising a catalytic reduction of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (18):

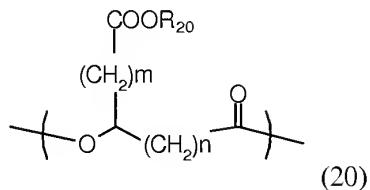


wherein R₁₈ represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group; n represents an integer selected from 0, 2, 3 and 4; m represents an integer selected from 2 - 8 in case n is 0, or an integer selected from 0 - 8 in case n is 2, 3 or 4; and in case plural units are present, R₁₈, m and n have the aforementioned meanings independently for each unit;

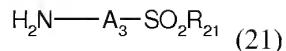


wherein R₁₉ represents hydrogen, or a group capable of forming a salt; n represents an integer selected from 0, 2, 3 and 4; m represents an integer selected from 2 - 8 in case n is 0, or an integer selected from 0 - 8 in case n is 2, 3 or 4; and, in case plural units are present, R₁₉, m and n have the aforementioned meanings independently for each unit.

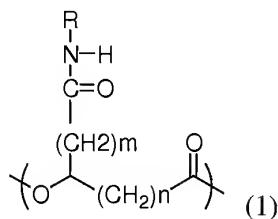
11. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (1), comprised of a step of executing a condensation reaction of a polyhydroxyalkanoate comprising a unit represented by a chemical formula (20) and an amine compound represented by a chemical formula (21):



wherein R_{20} represents hydrogen, or a group capable of forming a salt; n represents an integer selected from 0 - 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, or m is 0 in case n is 1; and, in case plural units are present, m and n and R_{20} have the aforementioned meanings independently for each unit;

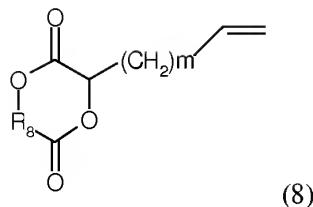


wherein R_{21} represents OH, a halogen atom, ONa, OK or OR_{21a} ; R_{21a} and A_3 each independently is selected from a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure; and, in case plural units are present, R_{21} , R_{21a} and A_3 have the aforementioned meanings independently for each unit;



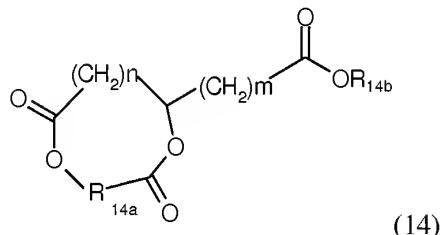
wherein R represents $-\text{A}_1-\text{SO}_2\text{R}_1$; R_1 represents OH, a halogen atom, ONa, OK or OR_{1a} ; R_{1a} and A_1 each independently represents a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure; n represents an integer selected from 0 to 4; m represents an integer selected from 0 - 8 in case n is 0, 2, 3 or 4, and m represents 0 in case n is 1; and in case plural units are present, R, R_1 , R_{1a} , A_1 , m and n have the aforementioned meanings independently for each unit.

12. (Withdrawn) A compound represented by a chemical formula (8):



wherein R₈ represents a linear or branched alkylene 1 - 11 carbon atoms, or alkyleneoxyalkylene group with (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which is unsubstituted or substituted with an aryl group; and m represents an integer selected from 2 - 8.

13. (Withdrawn) A compound represented by a chemical formula (14):



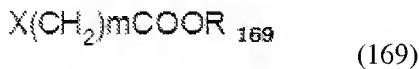
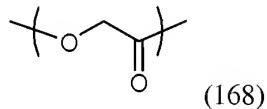
wherein R_{14a} represents a linear or branched alkylene with 1 - 11 carbon atoms, alkyleneoxyalkylene group (each alkylene group being independently with 1 - 2 carbon atoms), a linear or branched alkenyl group with 1 - 11 carbon atoms or an alkylidene group with 1 - 5 carbon atoms which is unsubstituted or substituted with an aryl group; R_{14b} represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group; n represents an integer selected from 0, 2, 3 and 4; m represents an integer

selected from 2 - 8 in case n is 0 and an integer selected from 0 - 8 in case n is selected from 2 - 4.

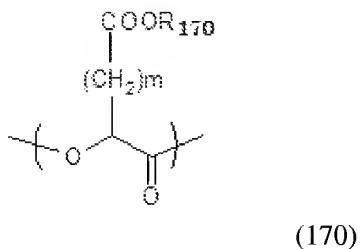
14. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (170), comprised of:

a step of reacting a polyhydroxyalkanoate comprising a unit represented by a chemical formula (168) with a base; and

a step of reacting a compound obtained in the aforementioned step with a compound represented by a chemical formula (169):



wherein m represents an integer selected from 0 - 8; X represents a halogen atom; and R₁₆₉ represents a linear or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group:



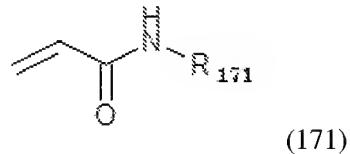
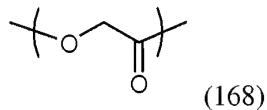
wherein m represents an integer selected from 0 - 8; R₁₇₀ represents a linear

or branched alkyl group with 1 - 12 carbon atoms or an aralkyl group; and in case plural units are present, R_{170} and m have the aforementioned meanings independently for each unit.

15. (Withdrawn) A method for producing a polyhydroxyalkanoate comprising a unit represented by a chemical formula (172), comprised of:

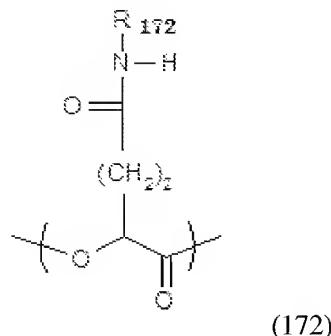
a step of reacting a polyhydroxyalkanoate comprising a unit represented by a chemical formula (168) with a base; and

a step of reacting a compound obtained in the aforementioned step with a compound represented by a chemical formula (171):



wherein R_{171} represents $-A_{171}-SO_2R_{171a}$; R_{171a} represents OH, a halogen atom, ONa, OK or OR_{171b}; R_{171b} and A_{171} each independently is selected from a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure; and in case plural units are present, R_{171} , R_{171a} , R_{171b} , and A_{171} have the

aforementioned meanings independently for each unit;



(172)

wherein R₁₇₂ represents -A₁₇₂-SO₂R_{172a}; R_{172a} represents OH, a halogen atom, ONa, OK or OR_{172b}; R_{172b} and A₁₇₂ each independently represents a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure; and in case plural units are present, R₁₇₂, R_{172a}, R_{172b}, and A₁₇₂ have the aforementioned meanings independently for each unit.